

## WHAT IS CLAIMED IS:

1. An isolated nucleic acid, wherein said nucleic acid is selected from the group consisting of:
  - (i) a nucleic acid comprising at least one of the nucleic acid sequences listed in SEQ ID NOs 1, 3, 5, 7, 9, 11, 13, 15, 41, and 43;
  - (ii) a nucleic acid having a sequence of at least 80 % identity, preferably at least 90 % identity, more preferred at least 95 % identity, most preferred at least 98 % identity with any of the nucleic acid sequences listed in SEQ ID NOs 1, 3, 5, 7, 9, 11, 13, 15, 41, and 43;
  - (iii) a nucleic acid that hybridizes to a nucleic acid of (i) or (ii);
  - (iv) a nucleic acid, wherein said nucleic acid is derivable by substitution, addition and/or deletion of one of the nucleic acids of (i), (ii) or (iii);
  - (v) a fragment of any of the nucleic acids of (i) to (iv), that hybridizes to a nucleic acid of (i).
2. The nucleic acid according to claim 1, wherein said nucleic acid is a DNA, a RNA or a PNA.
3. The nucleic acid according to claim 1, wherein said nucleic acid encodes a polypeptide that is capable of modulating an immune response, wherein preferably said immune response is a T cell response, a B cell response, or a T cell and a B cell response.
4. An isolated polypeptide comprising a polypeptide sequence encoded by a nucleic acid according to claim 1.
5. The polypeptide according to claim 4, wherein said polypeptide sequence is selected from the group consisting of:
  - (i) hsB7-H4LV (SEQ ID NO:2);
  - (ii) hsB7-H4LV(ECD) (SEQ ID NO:4);
  - (iii) hsB7-H5 (SEQ ID NO:6);
  - (iv) hsB7-H5(ECD) (SEQ ID NO:8);
  - (v) mB7-H5 (SEQ ID NO:10);
  - (vi) mB7-H5(ECD) (SEQ ID NO:12);
  - (vii) mB7-H6 (SEQ ID NO:14);

- (viii) mB7-H6(ECD) (SEQ ID NO:16);
- (ix) hsB7-H6 (SEQ ID NO:42);
- (x) hsB7-H6(ECD) (SEQ ID NO:44) and;
- (xi) a functional derivative of (i), (ii), (iii), (iv), (v), (vi), (vii), (viii), (ix), or (x).

6. The polypeptide according to claim 4, wherein said polypeptide is capable of modulating an immune response, wherein preferably said immune response is a T cell response, a B cell response, or a T cell and a B cell response.
7. The polypeptide according to claim 5, wherein said polypeptide is capable of modulating an immune response, wherein preferably said immune response is a T cell response, a B cell response, or a T cell and a B cell response.
8. A recombinant vector, comprising a nucleic acid according to claim 1.
9. A recombinant vector, wherein said recombinant vector is capable of producing a polypeptide according to claim 4.
10. A host cell comprising a nucleic acid according to claim 1.
11. An antibody that specifically binds a polypeptide according to claim 4.
12. An antibody directed against a polypeptide according to claim 4, wherein said antibody inhibits the polypeptides capability to modulate an immune response.
13. An antibody directed against a polypeptide according to claim 5, wherein said antibody inhibits the polypeptides capability to modulate an immune response.
14. A hybridoma cell line, expressing an antibody that specifically binds a polypeptide according to claim 4.
15. A transfected cell line capable of expressing the antibody according to claim 13.

16. A pharmaceutical composition comprising a polypeptide according to claim 4 and a pharmaceutically acceptable carrier.
17. A pharmaceutical composition comprising a polypeptide according to claim 5 and a pharmaceutically acceptable carrier.
18. A pharmaceutical composition comprising an antibody according to claim 13 and a pharmaceutically acceptable carrier.
19. A polypeptide according to claim 4 for use as a medicament.
20. A polypeptide according to claim 5 for use as a medicament.
21. An antibody according to claim 13 for use as a medicament.
22. Use of a polypeptide according to claim 4 for the preparation of a medicament for modulating the immune response.
23. Use of a polypeptide according to claim 5 for the preparation of a medicament for treating and/or preventing autoimmune diseases including, and preferably consisting of, type I diabetes and multiple sclerosis, asthma, arthritis, myasthenia gravis, arthritis, lupus erythematosus, pemphigus, psoriasis, colitis or rejection of transplanted organs, rejection of xenotransplants, immuno deficiency diseases, and cancer.
24. Use of an antibody according to claim 13 for the preparation of a medicament for treating and/or preventing autoimmune diseases including, and preferably consisting of, type I diabetes and multiple sclerosis, asthma, arthritis, myasthenia gravis, arthritis, lupus erythematosus, pemphigus, psoriasis, colitis or rejection of transplanted organs, rejection of xenotransplants, immuno deficiency diseases, and cancer.
25. A method of identifying a compound that modulates an immune response, which method comprises:
  - (i) contacting a B cell and/or T cell with a polypeptide according to claim 4 in the absence or presence of a compound of interest;

(ii) comparing the immune response in the absence of said compound of interest with the immune response in the presence of said compound of interest.

26. The method of claim 25, wherein the contacting step (i) is performed by contacting B cells, T cells, or B cells and T cells, with cells expressing said polypeptide, with a polypeptide that is matrix-bound, or with a free polypeptide.

27. A method of treating and/or preventing a disease in a mammal, wherein said disease is selected from autoimmune diseases and diseases that benefit from an enhanced or reduced immune response, preferably type I diabetes and multiple sclerosis, asthma, arthritis, psoriasis, colitis or rejection of transplanted organs, immuno deficiency diseases, or cancer, which method comprises administering to the mammal a therapeutically effective amount of the polypeptide according to claim 4.

28. A method of producing the polypeptide according to claim 4, said method comprising the steps of:

- providing the host cell according to claim;
- culturing said host cell under conditions suitable for expression of said polypeptide; and
- isolating said polypeptide from said host cell.

29. A method of producing an antibody, said method comprising the steps of:

- providing the hybridoma cell according to claim 14;
- culturing said hybridoma cell under conditions suitable for expression of said antibody; and
- isolating said antibody from said hybridoma cell.

30. A method of producing an antibody, said method comprising the steps of:

- providing a cell line transfected to express said antibody according to claim 15;
- culturing said cell line under conditions suitable for expression of said antibody; and
- isolating said antibody from said cell line.